

Claims

- [c1] 1. A method for forming a contact or via plug, comprising:
forming a dielectric layer on a substrate;
forming a patterned photoresist layer on the dielectric layer;
removing a portion of the dielectric layer exposed by the photoresist layer to form a first opening by using the patterned photoresist layer as a mask;
forming a first liner on surfaces of the photoresist layer;
removing a portion of the dielectric layer under the first opening to form a second opening by using the patterned photoresist layer and the first liner as a mask, wherein the second opening incorporates the first opening;
forming a second liner on the photoresist layer covering the first liner;
removing a portion the dielectric layer under the second opening to form a third opening exposing the substrate by using the patterned photoresist layer and the second liner as a mask, wherein the third opening incorporates the second opening;
removing the second liner, the first liner and the photoresist layer; and
filling a conductive material into the third opening to form a contact or via plug.
- [c2] 2. The method of claim 1, wherein the first liner and the second liner have etching rates lower than an etching rate of the dielectric layer.
- [c3] 3. The method of claim 1, wherein each of the first liner and the second liner comprises a polymer layer.
- [c4] 4. The method of claim 1, wherein the dielectric layer comprises silicon oxide.
- [c5] 5. The method of claim 1, wherein forming the first liner and the second liner comprises performing a plasma-enhanced chemical vapor deposition (PECVD) process.
- [c6] 6. The method of claim 5, wherein the PECVD process uses a reaction gas mainly comprising CH_2F_2 , $\text{CH}_2\text{F}_2/\text{C}_4\text{F}_8$ mixture, or $\text{CH}_2\text{F}_2/\text{CHF}_3$ mixture.
- [c7] 7. The method of claim 5, wherein the PECVD process further uses an optionally additive gas including argon (Ar), carbon monoxide (CO), oxygen (O_2) and

$$x = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{pmatrix}, \quad u = \begin{pmatrix} u_1 \\ u_2 \\ u_3 \\ u_4 \end{pmatrix}, \quad v = \begin{pmatrix} v_1 \\ v_2 \\ v_3 \\ v_4 \end{pmatrix}, \quad w = \begin{pmatrix} w_1 \\ w_2 \\ w_3 \\ w_4 \end{pmatrix}, \quad z = \begin{pmatrix} z_1 \\ z_2 \\ z_3 \\ z_4 \end{pmatrix}$$

- App ID=10064765

(The following text is extremely faint and largely illegible due to poor scan quality. It appears to contain several lines of handwritten or typed notes.)

- App ID=10064765